Trend Study 16C-20-04

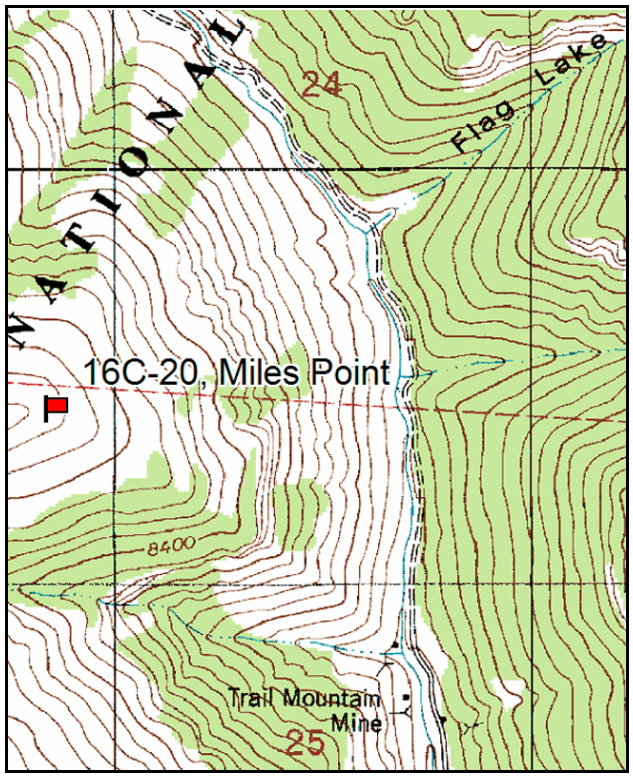
Study site name: Miles Point . Vegetation type: Mountain Big Sagebrush .

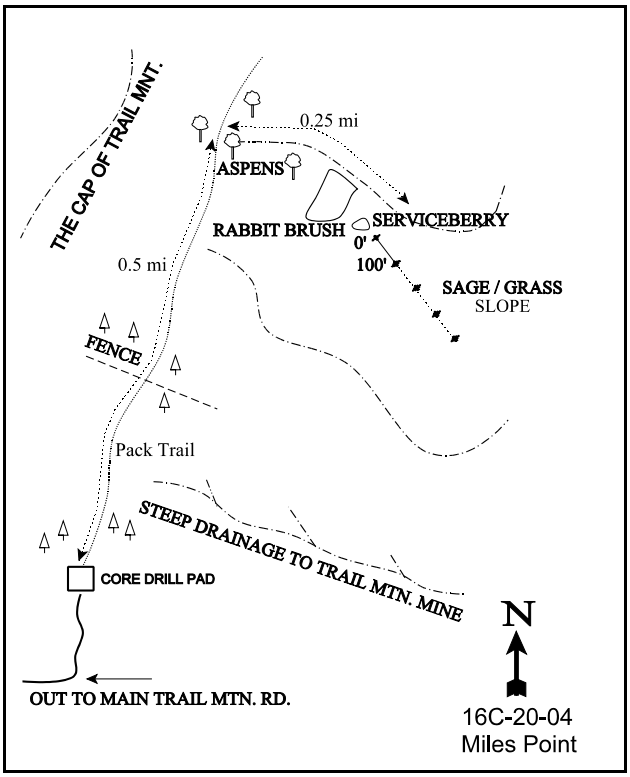
Compass bearing: frequency baseline 112 degrees magnetic.

Frequency belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

From the pass at the top of the Cottonwood Canyon Road (10.15 miles from Straight Canyon), take the Trail Mountain road southeast for approximately 9.5 miles to the south end of the Cap of Trail Mountain. The study site is to the NE, on the other side of this high cap. A new road takes off to the east from the main road just past the southern point of the cap. Follow this road for 0.65 miles and stop before you enter the thick timber. From here, a pack trail takes off to the north along the edge of Trail Mountain. Follow this trail for about 1/2 miles to an open ridge. Turn east and hike down this ridge to the SE for 1/4 mile. The study is located on a sage-grass slope on the SE side of the ridge. The 0-foot baseline stake, marked by browse tag #9030, is adjacent to a large clump of serviceberry. The area has a view of lower Cottonwood Canyon and the fields in Straight Canyon.





Map Name: Mahogany Point Diagrammatic Sketch

Township 17S , Range 6E ,Section 25 GPS: NAD 27, UTM 12S 4352383 N, 482834 E

DISCUSSION

Miles Point - Trend Study No. 16C-20

This study is not actually situated on Miles Point, but on a similar sagebrush/grass point above the Trail Mountain mine in Cottonwood Canyon. This study samples a typical high elevation elk winter range, which mule deer use in the summer. The study is on a moderately steep slope (35%) with a southeast aspect. The elevation is 8,800 feet. There is moderate elk sign on the open, south-facing ridge. Nearby aspen, curlleaf mountain mahogany, and conifer stands also show evidence of elk winter use. The study site is in the Trail Mountain summer cattle allotment, but actually receives little use by cattle. Pellet group data from 1999 estimated 70 elk, 3 deer, and 2 cow days use/acre (173 edu/ha, 7 ddu/ha, and 5 cdu/ha). Nearly all of the elk pellet groups were from the previous winter, although a few were more recent. Cattle pats were old. Pellet group data from 2004 estimated 56 elk, 5 deer, and 8 days use/acre (139 edu/ha, 13 ddu/ha, and 20 cdu/ha).

Soil on the site is moderately deep with an effective rooting depth estimated at almost 17 inches. Soil texture is a clay loam with a slightly alkaline pH (7.5). Phosphorus levels are marginal at 6 ppm. Values less than 10 ppm can limit normal plant growth and development. Soil parent material is limestone with rocks common within the profile. Vegetation and litter cover are adequate to protect the soil on the slope from excessive movement, but some soil pedestaling and terracing is evident. On the downhill side of terraces there are some plant roots exposed. The abundant grasses provide over half of vegetative cover. Litter is also abundant. Rocks and pavement occur in the interspaces leaving little exposed bare soil.

The key browse on the sagebrush/grass slope is mountain big sagebrush. Sagebrush cover along the baseline is higher near the zero foot stake and decreases as you reach the 400 foot stake. Sagebrush provided 66% of the browse cover in 1994, 80% in 1999, and 57% in 2004. The mountain big sagebrush population has shifted from predominantly young plants in 1988 to a more mature/decadence stand in 2004. Percent decadency has increased from 14% in 1999 to 57% in 2004. The number of dead plants has more than doubled from 800 dead plants/acre in 1999 to 1,920 dead plants/acre in 2004. The increase of decadent/dead plants is mostly due to severe drought conditions since 2002 and competition from perennial grasses. Annual precipitation has been below average since 2001 and annual spring precipitation (April, May, and June) has been below normal since 2000. Most plants were vigorous with good annual leader growth averaging about 3 inches in 2004. This site is used predominantly by elk, which do not rely as heavily on sagebrush as deer. Browsing on sagebrush has increased slightly from light to moderate in 1988 and 1999 to moderate to heavy in 2004.

Other common shrubs include dwarf rabbitbrush, low rabbitbrush, and snowberry. Dwarf rabbitbrush (*Chrysothamnus depressus*) has displayed consistent moderate to heavy use since 1988. Vigor is good and percent decadence low. The large decline in density of dwarf rabbitbrush between 1988 and 1994 is mostly due to the much larger sample used in 1994. The scattered Utah serviceberry shows light use and good vigor. Snowberry also shows light use with a stable population density, although shifting towards a more mature stand.

Bluebunch wheatgrass and Salina wildrye provide most the herbaceous understory cover due to their large bunchgrass stature. Bluebunch wheatgrass increased significantly between 1988 to 1999 and slightly declined in 2004. Other grass species are uncommon. Grasses showed light utilization overall, but some were moderately utilized in 1999 and 2004. Forbs are rare with timber poison vetch the only common species.

1994 TREND ASSESSMENT

Bare ground has decreased slightly although there was a decrease in litter cover. Herbaceous vegetative cover is abundant and provides a majority of the ground cover. Trend for soil is considered stable. The key browse is mountain big sagebrush. It has a low number of seedlings and young plants this year, but most of the young

sampled in 1988 appear to have survived and are now mature. Utilization is light, although percent decadency has increased. The trend for browse is stable. Summed nested frequency for perennial grasses has increased substantially since 1988. Summed nested frequency for forbs has decreased greatly and is mostly due to one plant, timber poisonvetch. Because the perennial grass component contributes to about 99% of the herbaceous cover, trend for herbaceous understory is considered slightly up. The Desirable Components Index (see methods) rated this site as good with a score of 67 due to moderate decadence, few young shrubs, and excellent perennial grass cover, although forb cover is almost nonexistent.

TREND ASSESSMENT
soil - stable (3)
browse - stable (3)
herbaceous understory - slightly up (4)
winter range condition (DC Index) - 67 (good) Mountain big sagebrush type

1999 TREND ASSESSMENT

Trend for soil continues to be stable due to similar ground cover characteristics compared to 1994. There is some localized soil movement occurring yet the abundance of herbaceous vegetation cover has stabilized the slope. Trend for the key browse, mountain big sagebrush, is stable. Sagebrush density has increased slightly, vigor is normal, and percent decadence has declined slightly. However, utilization is heavier and reproduction is marginally low. In addition, 42% (220 plants/acre) of the decadent plants appear to be dying. Currently, there are enough young plants within the population to replace the decadent and dying sagebrush. Trend for the herbaceous understory is stable. Sum of nested frequency of perennial grasses has remained stable while frequency of forbs has increased slightly. Nested frequency of Salina wildrye declined significantly with the more preferred, bluebunch wheatgrass increased significantly. There may have been some confusion in the identification between these two species in 1994. The Desirable Components Index rated this site as good with a score of 76 due to good shrub cover, increase in young shrubs, and excellent perennial grass cover, although forb cover is still low.

TREND ASSESSMENT
soil - stable (3)
browse - stable (3)
herbaceous understory - stable (3)
winter range condition (DC Index) - 76 (good) Mountain big sagebrush type

2004 TREND ASSESSMENT

Trend for soil is down slightly due to a decrease in protective cover (vegetation, litter, and cryptogams) and an increase in exposed bare ground since 2004. Herbaceous cover has decreased slightly and steep slopes continue to allow some soil movement. Trend for key browse, mountain big sagebrush, is down. Sagebrush densities have decreased, percent decadency has increased, utilization is heavier, and young recruitment is minimal. In addition, 43% (520 plants/ acre) of the decadent plants appear to be dying. Currently, there is not enough young plants within the population to replace the decadent and dying plants. Trend for herbaceous understory is slightly down. Sum of nested frequency for both perennial grasses and forbs have decreased slightly. Nested frequency of bluebunch wheatgrass has decreased significantly since 1999, while Salina wildrye has remained stable. The Desirable Components Index rated this site as poor with a score of 48 due to a decrease in shrub cover, a large increase in decadent shrubs, with continued excellent perennial grass cover, although forb cover is still low.

TREND ASSESSMENT
soil - down slightly (2)
browse - down (1)
herbaceous understory - down slightly (2)
winter range condition (DC Index) - 48 (poor) Mountain big sagebrush type

HERBACEOUS TRENDS --
Management unit 16C, Study no: 20

Type	Species	Nested Frequency				Average Cover %		
		'88	'94	'99	'04	'94	'99	'04
G	Agropyron spicatum	$_{a}$212	$_{ab}$234	$_{c}$313	$_{b}$271	14.05	19.32	15.14
G	Elymus salina	$_{a}$64	$_{b}$123	$_{a}$59	$_{a}$47	8.85	3.98	3.20
G	Poa fendleriana	7	12	6	9	.03	.09	.04
G	Stipa lettermani	21	15	6	13	.13	.18	.62
Total for Annual Grasses		0	0	0	0	0	0	0
Total for Perennial Grasses		304	384	384	340	23.06	23.57	19.01
Total for Grasses		304	384	384	340	23.06	23.57	19.01
F	Androsace septentrionalis (a)	-	-	3	-	-	.00	-
F	Astragalus convallarius	$_{b}$147	$_{a}$14	$_{a}$29	$_{a}$22	.04	.77	.33
F	Aster spp.	2	2	-	2	.00	-	.01
F	Astragalus spp.	-	-	3	-	-	.03	-
F	Castilleja linariaefolia	$_{b}$13	$_{a}$-	$_{a}$-	$_{a}$-	-	-	-
F	Calochortus nuttallii	1	2	1	-	.00	.01	-
F	Chaenactis douglasii	-	-	5	3	-	.03	.00
F	Cirsium neomexicanum	4	-	2	-	-	.03	-
F	Crepis acuminata	7	-	-	-	-	-	-
F	Cymopterus spp.	-	-	-	3	-	-	.00
F	Hedysarum boreale	-	-	2	-	-	.15	-
F	Hymenoxys richardsonii	-	-	-	-	.00	.00	-
F	Machaeranthera canescens	$_{b}$9	$_{a}$2	$_{ab}$4	$_{ab}$5	.00	.06	.04
F	Penstemon caespitosus	-	-	5	1	-	.06	.00
F	Phlox longifolia	3	-	1	-	-	.00	-
F	Polygonum douglasii (a)	-	-	-	2	-	-	.00
F	Tragopogon dubius	4	-	-	-	-	-	-
F	Unknown forb-perennial	4	3	-	-	.00	-	-
Total for Annual Forbs		0	0	3	2	0	0.00	0.00
Total for Perennial Forbs		194	23	52	36	0.06	1.15	0.39
Total for Forbs		194	23	55	38	0.06	1.15	0.39

Values with different subscript letters are significantly different at alpha = 0.10

BROWSE TRENDS --
Management unit 16C, Study no: 20

Type	Species	Strip Frequency			Average Cover %		
		'94	'99	'04	'94	'99	'04
B	Amelanchier utahensis	2	0	1	-	-	-
B	Artemisia tridentata vaseyana	86	85	64	12.65	15.80	9.22
B	Chrysothamnus depressus	12	20	20	.84	.79	.84
B	Chrysothamnus nauseosus	0	0	1	-	-	-
B	Chrysothamnus viscidiflorus viscidiflorus	70	67	62	2.86	1.28	3.64
B	Sambucus cerulea	0	1	1	.15	.15	.15
B	Symphoricarpos oreophilus	39	39	30	2.54	1.69	1.97
B	Tetradymia canescens	7	8	10	-	-	.24
Total for Browse		216	220	189	19.06	19.73	16.08

CANOPY COVER, LINE INTERCEPT --
Management unit 16C, Study no: 20

Species	Percent Cover '04
Artemisia tridentata vaseyana	8.89
Chrysothamnus depressus	1.45
Chrysothamnus viscidiflorus viscidiflorus	5.23
Symphoricarpos oreophilus	1.76
Tetradymia canescens	.50

KEY BROWSE ANNUAL LEADER GROWTH --
Management unit 16C, Study no: 20

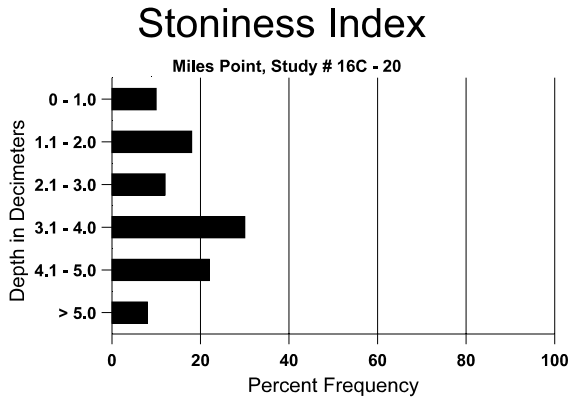
Species	Average leader growth (in) '04
Artemisia tridentata vaseyana	2.9

BASIC COVER --
Management unit 16C, Study no: 20

Cover Type	Average Cover %			
	'88	'94	'99	'04
Vegetation	13.50	44.13	44.77	36.15
Rock	3.75	7.74	6.75	9.15
Pavement	3.50	1.18	6.38	5.17
Litter	58.75	42.52	43.77	33.15
Cryptogams	0	.03	.18	.96
Bare Ground	20.50	18.95	16.36	34.59

SOIL ANALYSIS DATA --
Management unit 16C, Study no: 20, Study Name: Miles Point

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	ds/m
16.9	48.5 (18.0)	7.5	24.7	29.4	45.8	3.1	6.0	128.0	0.5



PELLET GROUP DATA --
Management unit 16C, Study no: 20

Type	Quadrat Frequency		
	'94	'99	'04
Rabbit	11	10	29
Moose	-	-	1
Elk	31	24	36
Deer	9	2	4
Cattle	-	2	1

Days use per acre (ha)	
'99	'04
-	-
-	-
70 (173)	56 (139)
3 (7)	5 (13)
2 (5)	8 (20)

BROWSE CHARACTERISTICS --
Management unit 16C, Study no: 20

		Age class distribution (plants per acre)					Utilization					
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% dying	% poor vigor	Average Height Crown (in)
Amelanchier utahensis												
88	**0**	-	-	-	-	-	0	0	-	-	0	-/-
94	**40**	-	-	40	-	-	0	0	-	-	0	33/40
99	**0**	-	-	-	-	-	0	0	-	-	0	36/20
04	**20**	-	-	20	-	-	0	100	-	-	0	31/36
Artemisia tridentata vaseyana												
88	**2799**	66	1866	733	200	-	33	7	7	-	0	22/32
94	**3600**	-	220	2640	740	600	19	.55	21	7	7	21/33
99	**3840**	100	360	2960	520	800	32	1	14	6	8	22/32
04	**2120**	60	80	840	1200	1920	55	25	57	25	25	17/27
Chrysothamnus depressus												
88	**4732**	-	266	3800	666	-	42	17	14	-	3	3/7
94	**920**	20	-	840	80	-	20	22	9	-	0	4/8
99	**1480**	-	40	1340	100	60	18	34	7	4	4	4/7
04	**1200**	-	-	1120	80	180	25	37	7	-	0	4/10
Chrysothamnus nauseosus												
88	**0**	-	-	-	-	-	0	0	-	-	0	-/-
94	**0**	-	-	-	-	-	0	0	-	-	0	-/-
99	**0**	-	-	-	-	-	0	0	-	-	0	-/-
04	**20**	-	-	20	-	-	0	0	-	-	0	19/19
Chrysothamnus viscidiflorus viscidiflorus												
88	**5666**	-	1466	4200	-	-	0	0	0	-	0	10/12
94	**4780**	-	60	4620	100	-	.83	0	2	-	.83	10/16
99	**4100**	100	360	3420	320	-	15	0	8	2	2	12/15
04	**3860**	-	-	3780	80	20	8	5	2	2	2	9/14
Sambucus cerulea												
88	**0**	-	-	-	-	-	0	0	-	-	0	-/-
94	**0**	-	-	-	-	-	0	0	-	-	0	26/30
99	**20**	-	-	20	-	-	0	0	-	-	0	22/24
04	**20**	-	20	-	-	-	0	0	-	-	0	31/22
Symphoricarpos oreophilus												
88	**1800**	200	1200	600	-	-	41	30	0	-	4	13/33
94	**1600**	-	60	1480	60	-	0	8	4	1	1	11/32
99	**1720**	20	280	1360	80	-	26	0	5	2	2	11/23
04	**1320**	-	40	1280	-	-	2	2	0	-	0	10/23

		Age class distribution (plants per acre)					Utilization					
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% dying	% poor vigor	Average Height Crown (in)
Tetradymia canescens												
88	**332**	-	66	266	-	-	40	20	0	-	0	7/10
94	**180**	-	-	160	20	-	0	0	11	-	0	9/9
99	**320**	-	20	300	-	-	31	0	0	-	0	8/9
04	**320**	-	-	300	20	-	63	0	6	-	0	9/13